CLAIMS

1. A method of optically routing packets, comprising the steps of:

a first step of impressing onto a silica optical fiber packet signaling information for a first packet on a signaling optical signal having a signaling wavelength within a first silica fiber band;

a second step of impressing onto said silica optical fiber a data payload for said first packet on a first optical signal having a first wavelength within a different second silica fiber band;

detecting from said silica optical fiber said signaling optical signal; and

based upon said detecting spatially switching said first optical signal without converting it to electrical form.

2. The method of Claim 1, further comprising:

a third step of impressing onto said silica optical fiber packet signaling information for a second packet on a second optical signal having said signaling wavelength;

a fourth step of impressing onto said silica optical fiber a data payload for said second packet on a second optical signal having a second wavelength different from said first wavelength within said second silica fiber band; and

based upon said detecting step spatially switching said second optical signal without converting it to electrical form.

3. The method of Claim 2, wherein said first and third impressing steps include impressing first and second RF signals upon said second optical signal.

4. A method of optically routing packets, comprising the steps of:

at a first time, impressing onto an optical transmission path packet signal information for a first packet on a first optical signal having a first wavelength;

at a second time later than said first time by a predetermined time difference, impressing

onto said optical transmission path a data payload for said first packet on a second optical signal having a different second wavelength;

detecting from said optical transmission path said first optical signal;

processing said detected first optical signal to determine a switching path, wherein said processing may be performed within a time period of no more than said time difference; and

switching said second optical signal according said determined switching path without converting it to electrical form.

5. The method of Claim 4, wherein said first and second wavelengths are different silica transmission bands.

6. The method of Claim 4, wherein said first and second wavelengths are in a same silica transmission band.

7. A method of optically routing packets, comprising the steps of:

a first step of impressing upon an optical transmission path a multi-wavelength signal comprising a plurality of optical data channels of different first optical wavelengths, each of said channels carrying a sequence of packet payloads;

a second step of impressing upon said optical transmission path an optical control signal containing directional information for switching of all of said packet payloads and carried at a second optical wavelength different from said first optical wavelengths;

detecting from said optical transmission path said optical control signal; and

based upon said directional information, switching said packet payloads in different spatial directions without converting said multi-wavelength signal to electronic form.

8. The method of Claim 7, wherein said first impressing step comprises impressing a plurality of electrical subcarrier signals upon said first optical signal.

9. The method of Claim 7, wherein said first optical wavelengths are in a first transmission band of a silica fiber and said second optical wavelength is in a second

transmission band of said silica fiber other than said first transmission band.

10. The method of Claim 7, wherein said first and second optical wavelengths are within a single transmission band of a silica fiber.

11. The method of Claim 7, further comprising delaying said multi-wavelength signal prior to said switching step without similarly delaying said optical control signal.

12. An optical packet switching method, comprising:

detecting a label portion of a packet impressed as an optical control signal on an optical transmission path at a first optical wavelength;

processing said detected optical control signal to determine a switching path for said pack; and

based upon said switching path switching a data portion of said packet impressed on a selected one of a plurality of optical data channels of different second optical wavelengths impressed on said optical transmission path without converting said packet data portion to electronic form, wherein said second optical wavelengths are different from said first optical wavelength.

13. The method of Claim 12, wherein said transmission path comprises silica fiber.

14. The method of Claim 13, wherein said first optical wavelength is included within a first transmission band of said silica fiber and said second optical wavelengths are included within a different, second optical band of said silica fiber.

15. An optical packet transmission method, comprising:

impressing upon an optical transmission path a plurality of data portions of a plurality of packets at selected ones of a plurality of first optical wavelengths; and

impressing upon said optical transmission path a plurality of label portions of said plurality of packets at a second optical wavelength different from said first wavelengths.

16. The system of Claim 15, wherein said optical transmission comprises a silica fiber.

17. The system of Claim 16, wherein said first optical wavelengths are within a first transmission band of said silica fiber and said second optical wavelengths is within a different, second transmission band of said silica fiber.

18. An optical router for a multi-wavelength signal including a first wavelength carrier containing switching information and at least two second wavelength carriers containing payload information, comprising:

one of more demultiplexers receiving said multi-wavelength signal and dividing them into a first optical path containing said first wavelength carriers and second and third optical paths containing respective ones of said second said second wavelength carriers;

an optical switching array including electrically controlled elements receiving said second and third optical paths and selectively connecting them to selected ones of output optical paths;

first and second optical delay lines disposed on said second and third optical paths between said demultiplexers and said switching array and capable of providing delays of at least 10ns;

a photodetector connected to said first optical path; and

control electronics receiving an output of said photodetector and controlling said electrically controlled elements to select a switching path through said optical switching array.

19. The optical router of Claim 18, wherein said optical delay lines have electrically controllable delay times.

20. The optical router of Claim 19, wherein each of said optical delay lines comprises a planar waveguide including two cladding layers sandwiching an active layer including at least two quantum wells, a close packed hexagonal array of features being formed in said active layer and a series of defects being formed in said array along an axis of said waveguide.